

target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2046-02-11T12:30:36.680
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Gaia source ID : 4115048715120678144
 2Mass ID (if available) : 17194547-2139044

Saturn 2046-02-11T12:30:36 K8.50 G13.17 PgtRgt

ICRS Star Coord at Epoch: 17h 19m 45.46193s -21:39:04.87329s

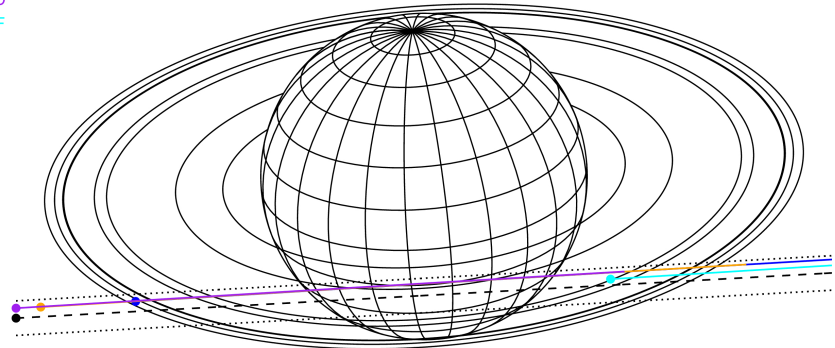
RUWE (>1.4 is poor) : 0.97
 K magnitude : 8.500
 G magnitude : 13.169
 RP magnitude : 11.990
 BP magnitude : 14.667
 DUPflag : 0
 Distance (au) : 10.456
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 23.72
 Sun-Target sep (deg) : 61.65
 Sun-Moon sep (deg) : 121.62
 B (ring opening deg) : 26.61
 PA of pole (deg) : 4.61

#	a(km)	ring
1	74490.6	C (IER)
2	91984.7	B (IER)
3	117571.2	B (OER)
4	122050.4	A (IER)
5	133423.3	Encke (IEG)
6	133744.9	Encke (OEG)
7	136774.4	A (OER)
8	140461.0	F ring



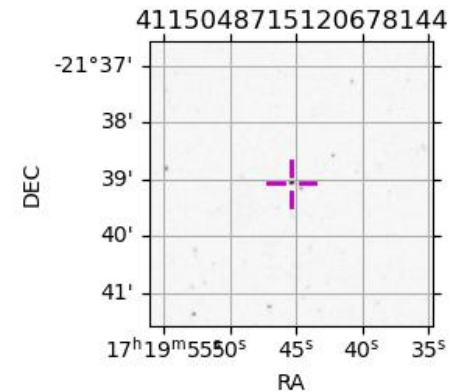
2046-02-11T12:30:366800 α: 17 19 45.4619 δ: -21 39 04.873 C/A 5.788° PA 3.17 deg v_sky +23.72 km/s D 10.46 AU
 Credit: Styled after SORA/Lucky Star

Earth
 PAL
 KPNO
 MCD
 IRTF

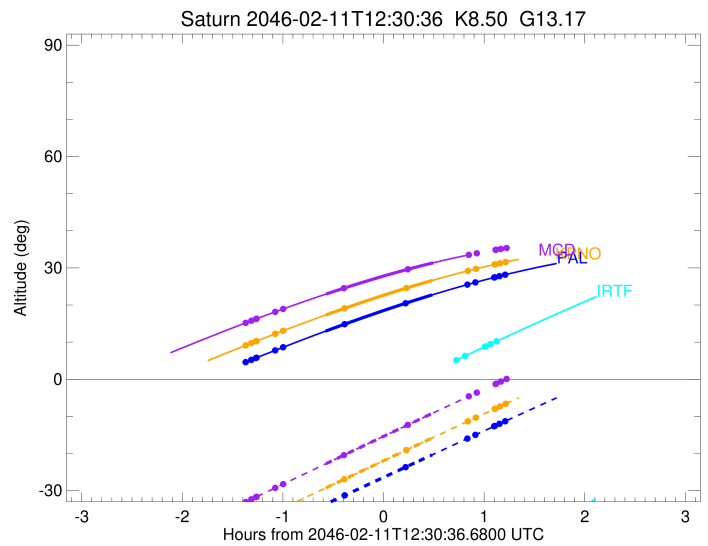
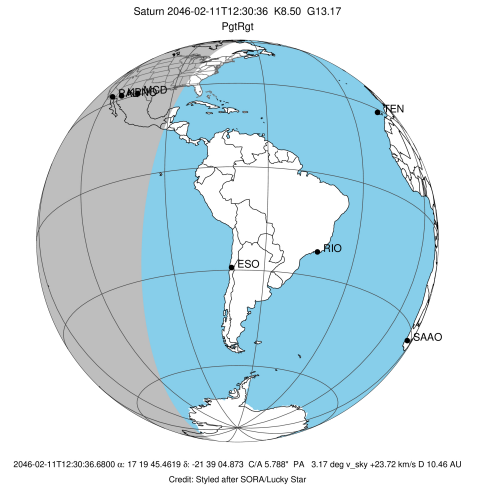


Observable events with sun below -5 deg and altitude above 5 deg unblocked by planet

Obs	Location	lat	Elon	Rings I	Planet	Rings E	Observed Events Interval	OEcode
PIC	Pic du Midi	42.9	0.1					PnnRnn
PAL	Palomar Mt (20	33.4	243.1	+ + + + +	+ +	+ + + + +	FEB 11 11:11 - FEB 11 13:43	PieRie
PMO	Purple Mtn Obs	32.1	118.8					PnnRnn
KPNO	Kitt Peak Natl	32.0	248.4	+ + + + +	+ +	+ + + + +	FEB 11 11:08 - FEB 11 13:43	PieRie
MCD	McDonald Obs.	30.7	256.0	+ + + + +	+ +		FEB 11 11:08 - FEB 11 13:00	PieRin
TEN	Teide Obs./Ten	28.3	343.5					PnnRnn
IRTF	Mauna Kea/IRTF	19.8	204.5			+ + + + +	FEB 11 13:14 - FEB 11 13:37	PnnRne
KAV	Kavalur Observ	12.6	78.8					PnnRnn
RIO	Rio de Janeiro	-22.9	316.8					PnnRnn
ESO	European South	-29.3	289.3					PnnRnn
AAT	Siding Spring	-31.3	149.1					PnnRnn
SAAO	So. Afr. Astro	-32.4	20.8					PnnRnn
MSO	Mt. Stromlo Ob	-35.3	149.0					PnnRnn



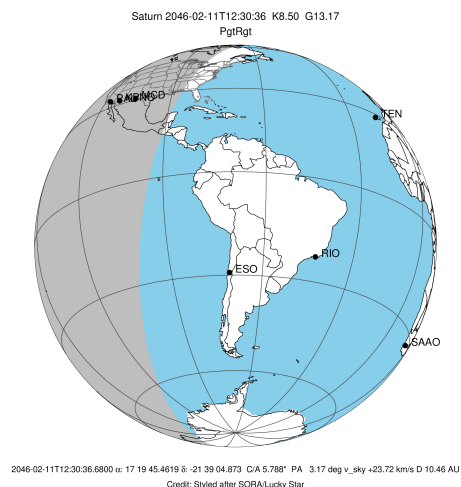
target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2046-02-11T12:27:46.640
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : PAL
 Location : Palomar Mt (200")
 Latitude (deg) : 33.35622
 E. Longitude (deg) : 243.13601
 Altitude (km) : 1.706
 Gaia source ID : 4115048715120678144
 2Mass ID (if available) : 17194547-2139044
 ICRS Star Coord at Epoch: 17h 19m 45.46193s -21:39:04.87329s
 RUWE (>1.4 is poor) : 0.97
 K magnitude : 8.500
 G magnitude : 13.169
 RP magnitude : 11.990
 BP magnitude : 14.667
 DUPflag : 0
 Distance (au) : 10.456
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 23.72
 Sun-Target sep (deg) : 61.65
 Sun-Moon sep (deg) : 121.58
 B (ring opening deg) : 26.61
 PA of pole (deg) : 4.61
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 5.216
 C/A sky separation (km) : 39558.1
 NAIF SPICE kernels : RAJobs_U111+rgf15.spk
 URKALLvl.spk
 Saturn_ring_plane.tf
 sat378.bsp
 sat286.bsp
 vgr1.sat286.bsp
 vgr2.sat286.bsp
 HST1081HSPephemUTC.bsp
 pfb10000r.bsp
 cassini.bsp
 earthstns_itrf93_040916.bsp
 earth_200101_990628_predict.bpc
 earth_720101_070426.bpc
 cpck28Mar2008.tpc
 pck.sat440.tpc
 IAU_SATURN_for_RINGFIT.tpc
 naif0012.tls
 earth_flat_IAU.spk



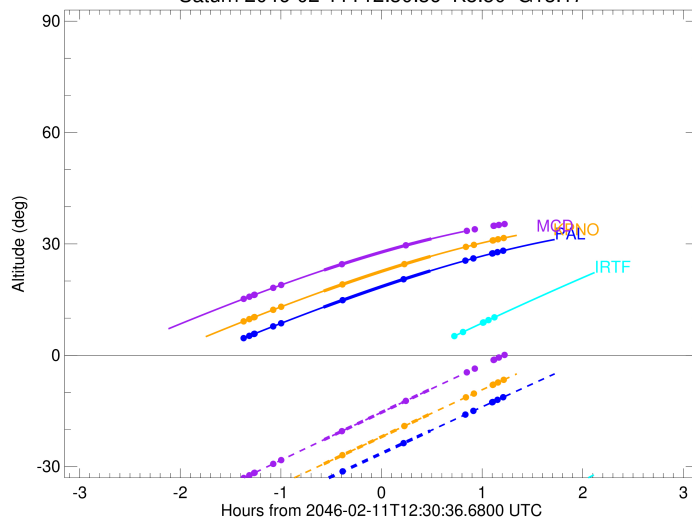
b: ring blocked by planet x: target alt < 5.0 deg or sun > -5.0 deg

Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
F ring	I	2046-02-11T11:08:19.559		4.60x	-43.51	140461.00	-18.39		
A (OER)	I	2046-02-11T11:11:41.891		5.21	-42.83	136774.40	-18.05		
Encke (OEG)	I	2046-02-11T11:14:31.129		5.72	-42.25	133744.89	-17.75		
Encke (IEG)	I	2046-02-11T11:14:49.266		5.78	-42.19	133423.31	-17.71		
A (IER)	I	2046-02-11T11:25:56.828		7.77	-39.90	122050.38	-16.30		
B (OER)	I	2046-02-11T11:30:37.759		8.59	-38.93	117571.16	-15.58		
B (IER)	I	2046-02-11T12:07:24.568	b	14.83	-31.28	91984.69	-6.52		
Saturn	I	2046-02-11T11:55:59.164		12.95	-33.67	59784.76		-35.36	-40.87
Saturn	E	2046-02-11T12:59:35.710		22.72	-20.36	59740.03		-37.25	-42.82
B (IER)	E	2046-02-11T12:43:41.081	b	20.46	-23.69	91984.69	6.49		
B (OER)	E	2046-02-11T13:20:40.059		25.50	-15.97	117571.16	15.47		
A (IER)	E	2046-02-11T13:25:23.092		26.09	-14.99	122050.38	16.17		
Encke (IEG)	E	2046-02-11T13:36:36.256		27.42	-12.66	133423.31	17.56		
Encke (OEG)	E	2046-02-11T13:36:54.557		27.46	-12.60	133744.89	17.59		
A (OER)	E	2046-02-11T13:39:45.361		27.78	-12.01	136774.40	17.88		
F ring	E	2046-02-11T13:43:09.639		28.16	-11.31	140461.00	18.21		

target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2046-02-11T12:27:58.130
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : KPNO
 Location : Kitt Peak Natl Obs
 Latitude (deg) : 31.96333
 E. Longitude (deg) : 248.40000
 Altitude (km) : 2.120
 Gaia source ID : 4115048715120678144
 2Mass ID (if available) : 17194547-2139044
 ICRS Star Coord at Epoch: 17h 19m 45.46193s -21:39:04.87329s
 RUWE (>1.4 is poor) : 0.97
 K magnitude : 8.500
 G magnitude : 13.169
 RP magnitude : 11.990
 BP magnitude : 14.667
 DUPflag : 0
 Distance (au) : 10.456
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 23.72
 Sun-Target sep (deg) : 61.65
 Sun-Moon sep (deg) : 121.65
 B (ring opening deg) : 26.61
 PA of pole (deg) : 4.61
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 5.210
 C/A sky separation (km) : 39510.1
 NAIF SPICE kernels : RAJobs_U111+rgf15.spk
 URKALLvl.spk
 Saturn_ring_plane.tf
 sat378.bsp
 sat286.bsp
 vgr1.sat286.bsp
 vgr2.sat286.bsp
 HST1081HSPephemUTC.bsp
 pfb10000r.bsp
 cassini.bsp
 earthstns_itrf93_040916.bsp
 earth_200101_990628_predict.bpc
 earth_720101_070426.bpc
 cpck28Mar2008.tpc
 pck.sat440.tpc
 IAU_SATURN_for_RINGFIT.tpc
 naif0012.tls
 earth_flat_IAU.spk

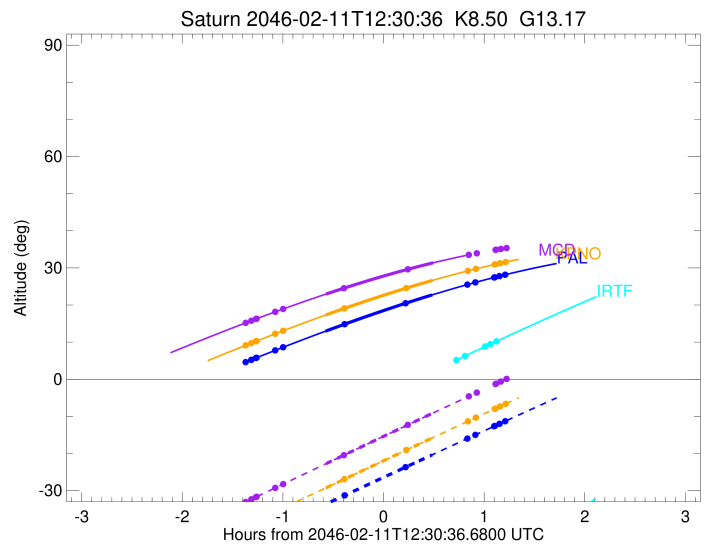
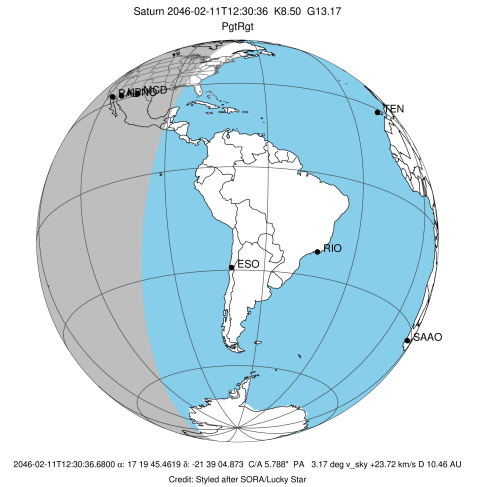


Saturn 2046-02-11T12:30:36 K8.50 G13.17



Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
F ring	I	2046-02-11T11:08:19.873		9.12	-39.41	140461.00	-18.38		
A (OER)	I	2046-02-11T11:11:42.303		9.72	-38.70	136774.40	-18.04		
Encke (OEG)	I	2046-02-11T11:14:31.610		10.22	-38.10	133744.89	-17.74		
Encke (IEG)	I	2046-02-11T11:14:49.753		10.28	-38.04	133423.31	-17.71		
A (IER)	I	2046-02-11T11:25:57.427		12.23	-35.69	122050.38	-16.30		
B (OER)	I	2046-02-11T11:30:38.309		13.04	-34.69	117571.17	-15.58		
B (IER)	I	2046-02-11T12:07:17.189	b	19.08	-26.91	91984.69	-6.60		
Saturn	I	2046-02-11T11:56:06.227		17.30	-29.29	59786.22		-35.30	-40.81
Saturn	E	2046-02-11T12:59:51.399		26.64	-15.76	59740.93		-37.21	-42.78
B (IER)	E	2046-02-11T12:44:08.074	b	24.54	-19.09	91984.69	6.58		
B (OER)	E	2046-02-11T13:20:58.563		29.20	-11.32	117571.16	15.48		
A (IER)	E	2046-02-11T13:25:41.434		29.73	-10.33	122050.38	16.18		
Encke (IEG)	E	2046-02-11T13:36:54.411		30.92	-7.99	133423.31	17.56		
Encke (OEG)	E	2046-02-11T13:37:12.709		30.96	-7.92	133744.89	17.59		
A (OER)	E	2046-02-11T13:40:03.498		31.24	-7.33	136774.40	17.88		
F ring	E	2046-02-11T13:43:27.769		31.57	-6.62	140461.00	18.21		

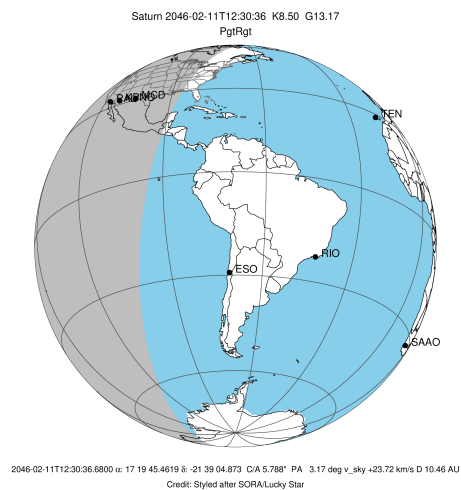
target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2046-02-11T12:28:18.760
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : MCD
 Location : McDonald Obs. 2.7m
 Latitude (deg) : 30.67158
 E. Longitude (deg) : 255.97844
 Altitude (km) : 2.075
 Gaia source ID : 4115048715120678144
 2Mass ID (if available) : 17194547-2139044
 ICRS Star Coord at Epoch: 17h 19m 45.46193s -21:39:04.87329s
 RUWE (>1.4 is poor) : 0.97
 K magnitude : 8.500
 G magnitude : 13.169
 RP magnitude : 11.990
 BP magnitude : 14.667
 DUPflag : 0
 Distance (au) : 10.456
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 23.72
 Sun-Target sep (deg) : 61.65
 Sun-Moon sep (deg) : 121.75
 B (ring opening deg) : 26.61
 PA of pole (deg) : 4.61
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 5.196
 C/A sky separation (km) : 39404.8
 NAIF SPICE kernels : RAJobs_U111+rgf15.spk
 URKALLvl.spk
 Saturn_ring_plane.tf
 sat378.bsp
 sat286.bsp
 vgr1.sat286.bsp
 vgr2.sat286.bsp
 HST1081HSPephemUTC.bsp
 pfb10000r.bsp
 cassini.bsp
 earthstns_itrf93_040916.bsp
 earth_200101_990628_predict.bpc
 earth_720101_070426.bpc
 cpck28Mar2008.tpc
 pck.sat440.tpc
 IAU_SATURN_for_RINGFIT.tpc
 naif0012.tls
 earth_flat_IAU.spk



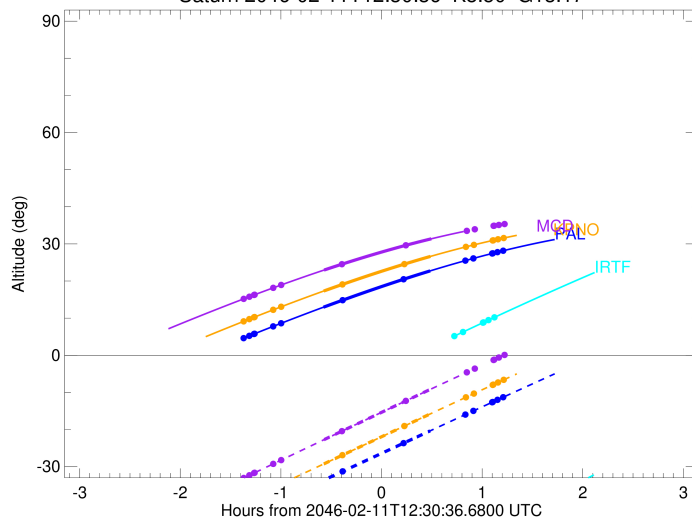
b: ring blocked by planet x: target alt < 5.0 deg or sun > -5.0 deg

Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
F ring	I	2046-02-11T11:08:21.611		15.18	-33.07	140461.00	-18.38		
A (OER)	I	2046-02-11T11:11:44.034		15.76	-32.34	136774.40	-18.04		
Encke (OEG)	I	2046-02-11T11:14:33.306		16.24	-31.74	133744.89	-17.75		
Encke (IEG)	I	2046-02-11T11:14:51.443		16.29	-31.67	133423.31	-17.71		
A (IER)	I	2046-02-11T11:25:58.631		18.15	-29.28	122050.38	-16.32		
B (OER)	I	2046-02-11T11:30:39.098		18.92	-28.27	117571.16	-15.61		
B (IER)	I	2046-02-11T12:06:58.906	b	24.53	-20.45	91984.69	-6.80		
Saturn	I	2046-02-11T11:56:19.437		22.95	-22.74	59789.42		-35.16	-40.67
Saturn	E	2046-02-11T13:00:18.997		31.37	-9.06	59743.01		-37.12	-42.69
B (IER)	E	2046-02-11T12:45:01.270	b	29.61	-12.31	91984.69	6.77		
B (OER)	E	2046-02-11T13:21:31.647		33.51	-4.59x	117571.16	15.52		
A (IER)	E	2046-02-11T13:26:13.900		33.94	-3.61x	122050.38	16.21		
Encke (IEG)	E	2046-02-11T13:37:25.840		34.86	-1.27x	133423.31	17.58		
Encke (OEG)	E	2046-02-11T13:37:44.117		34.89	-1.21x	133744.89	17.61		
A (OER)	E	2046-02-11T13:40:34.715		35.10	-0.62x	136774.40	17.90		
F ring	E	2046-02-11T13:43:58.785		35.35	0.09x	140461.00	18.22		

target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2046-02-11T12:26:31.690
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : IRTF
 Location : Mauna Kea/IRTF
 Latitude (deg) : 19.82622
 E. Longitude (deg) : 204.52800
 Altitude (km) : 4.168
 Gaia source ID : 4115048715120678144
 2Mass ID (if available) : 17194547-2139044
 ICRS Star Coord at Epoch: 17h 19m 45.46193s -21:39:04.87329s
 RUWE (>1.4 is poor) : 0.97
 K magnitude : 8.500
 G magnitude : 13.169
 RP magnitude : 11.990
 BP magnitude : 14.667
 DUPflag : 0
 Distance (au) : 10.456
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 23.72
 Sun-Target sep (deg) : 61.65
 Sun-Moon sep (deg) : 121.12
 B (ring opening deg) : 26.61
 PA of pole (deg) : 4.61
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 5.552
 C/A sky separation (km) : 42108.7
 NAIF SPICE kernels : RAJobs_U111+rgf15.spk
 URKALLvl.spk
 Saturn_ring_plane.tf
 sat378.bsp
 sat286.bsp
 vgr1.sat286.bsp
 vgr2.sat286.bsp
 HST1081HSPephemUTC.bsp
 pfb10000r.bsp
 cassini.bsp
 earthstns_itrf93_040916.bsp
 earth_200101_990628_predict.bpc
 earth_720101_070426.bpc
 cpck28Mar2008.tpc
 pck.sat440.tpc
 IAU_SATURN_for_RINGFIT.tpc
 naif0012.tls
 earth_flat_IAU.spk



Saturn 2046-02-11T12:30:36 K8.50 G13.17



b: ring blocked by planet x: target alt < 5.0 deg or sun > -5.0 deg

Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
F ring	I	2046-02-11T11:11:17.092		-21.96x	-79.74	140461.00	-17.74		
A (OER)	I	2046-02-11T11:14:47.252		-21.17x	-79.04	136774.40	-17.34		
Encke (OEG)	I	2046-02-11T11:17:43.822		-20.50x	-78.43	133744.89	-16.97		
Encke (IEG)	I	2046-02-11T11:18:02.791		-20.43x	-78.37	133423.31	-16.93		
A (IER)	I	2046-02-11T11:29:49.014		-17.78x	-75.86	122050.38	-15.20		
B (OER)	I	2046-02-11T11:34:52.498		-16.64x	-74.75	117571.16	-14.30		
Saturn	I	2046-02-11T11:56:48.321		-11.73x	-69.81	59715.73		-38.26	-43.85
Saturn	E	2046-02-11T12:56:17.555		1.35x	-55.97	59674.65		-39.95	-45.57
B (OER)	E	2046-02-11T13:14:05.723		5.17	-51.78	117571.16	14.18		
A (IER)	E	2046-02-11T13:19:12.071		6.26	-50.58	122050.38	15.05		
Encke (IEG)	E	2046-02-11T13:31:05.927		8.78	-47.78	133423.31	16.74		
Encke (OEG)	E	2046-02-11T13:31:25.119		8.85	-47.71	133744.89	16.78		
A (OER)	E	2046-02-11T13:34:23.822		9.47	-47.01	136774.40	17.13		
F ring	E	2046-02-11T13:37:56.633		10.21	-46.17	140461.00	17.51		